



SEQUENCE LISTING

<110> Goshorn, Stephen C.
Graves, Scott Stoll
Schultz, Joanne Elaine
Lin, Yukang
Sanderson, James A.
Reno, John M.

<120> STREPTAVIDIN EXPRESSED GENE FUSIONS AND
METHODS OF USE THEREOF

<130> 110186.547

<140> US 09/589,870

<141> 2000-06-05

<150> US 60/168,976

<151> 1999-12-03

<150> US 60/137,900

<151> 1999-06-07

<160> 48

<170> FastSEQ for Windows Version 4.0

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<212> DNA

<213> Streptomyces avidinii

<400> 1

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cggaacctac	gagtcggccg	tcggcaacgc	cgagagccgc	tacgtcctga	ccggtcgtta	300
cgacagcgcc	ccggccaccg	acggcagcgg	caccgccctc	ggttggacgg	tggcctggaa	360
gaataactac	cgcaacgccc	actccgcgac	cacgtggagc	ggccagtacg	tcggcggcgc	420
cgaggcgagg	atcaacaccc	agtggctgct	gacctccggc	accaccgagg	ccaacgcctg	480
gaagtccacg	ctggtcggcc	acgacacctt	caccaaggtg	aagccgtccg	ccgcctccat	540
cgacgcggcg	aagaaggccg	gcgtcaacaa	cggcaaccgc	ctcgacgccg	ttcagcagta	600
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<210> 2

<211> 183

<212> PRT

<213> Streptomyces avidinii

<400> 2

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	20	25	30
Gln Val Ser	Ala Ala Glu Ala Gly Ile Thr Gly Thr Trp Tyr Asn Gln		
	35	40	45
Leu Gly Ser	Thr Phe Ile Val Thr Ala Gly Ala Asp Gly Ala Leu Thr		
	50	55	60
Gly Thr Tyr	Glu Ser Ala Val Gly Asn Ala Glu Ser Arg Tyr Val Leu		
65	70	75	80
Thr Gly Arg	Tyr Asp Ser Ala Pro Ala Thr Asp Gly Ser Gly Thr Ala		
	85	90	95
Leu Gly Trp	Thr Val Ala Trp Lys Asn Asn Tyr Arg Asn Ala His Ser		
	100	105	110
Ala Thr Thr	Trp Ser Gly Gln Tyr Val Gly Gly Ala Glu Ala Arg Ile		
	115	120	125
Asn Thr Gln	Trp Leu Leu Thr Ser Gly Thr Thr Glu Ala Asn Ala Trp		
	130	135	140
Lys Ser Thr	Leu Val Gly His Asp Thr Phe Thr Lys Val Lys Pro Ser		
145	150	155	160
Ala Ala Ser	Ile Asp Ala Ala Lys Lys Ala Gly Val Asn Asn Gly Asn		
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Pro Leu Asp	Ala Val Gln Gln		
	180		

<210> 3

<211> 1612

<212> DNA

<213> Streptomyces avidinii

<400> 3

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ccatcgaccc	ggacctcgac	catccagttc	tgccgccaaa	gacacatgcc	gcactgctgt	180
ttgttcaccg	acaccgtcag	gtgcacggcc	gaggtcacaa	accttgacgg	gcgggatacg	240
gacggcgac	gccacagcgc	gccctccgtc	cccgcggggc	aacaactagg	gagtattttt	300
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gattacggcc	atggctgaca	tccagatgac	tcagtctcca	tcgtccttgt	ctgcctctgt	420
gggagacaga	gtcacgatca	cttgtcgggc	tagtcagggc	attagaggta	atttagactg	480
gtatcagcag	aaacctggta	agggaccgaa	actcctaata	tactccacat	ccaatttaaa	540
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cagcagcctt	cagcctgaag	atttcgcaac	gtattactgt	ctacagcgta	atgcgtatcc	660
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cggtggtggg	tcgggtggcg	gaggctcgag	ccaggttcag	ctgggtccagt	ctggggcaga	780
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agacacctat	atgcactggg	tgaggcaggc	acctggacag	ggcctgcagt	ggatgggaag	900
gattgatcct	gcgaatggta	atactaaatc	cgacctgtcc	ttccagggca	gggtgactat	960
aacagcagac	acgtccatca	acacagccta	catggaactc	agcagcctga	ggtctgacga	1020
cactgccgtc	tattactgtt	ctagagaggt	cctaactggg	acgtgggtctt	tggactactg	1080
gggtcaagga	accttagtca	ccgtgagctc	tggctctggg	tcggcagacc	cctccaagga	1140
ctcgaaggcc	caggtctcgg	ccgccgaggc	cggcataacc	ggcacctggg	acaaccagct	1200
cggctcgacc	ttcatcgtga	ccgcggggcg	cgacggcgcc	ctgaccggaa	cctacgagtc	1260
ggcgcctggc	aacgccgaga	gccgctacgt	cctgaccggg	cgttacgaca	gcgccccggc	1320
caccgacggc	agcggcaccg	ccctcggttg	gacgggtggc	tggagaata	actaccgcaa	1380
cgccactcc	gcgaccacgt	ggagcggcca	gtacgtcggc	ggcgccgagg	cgaggatcaa	1440

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caccagtggt ctgctgacct cgggcaccac cgaggccaac gcctggaagt ccacgctggt      1500
cggccacgac accttcacca aggtgaagcc gtccgcccgc tccatcgacg cggcgaagaa      1560
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<210> 4

<211> 431

<212> PRT

<213> Streptomyces avidinii

<400> 4

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 20          25          30
Leu Ser Ala Ser Val Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser
 35          40          45
Gln Gly Ile Arg Gly Asn Leu Asp Trp Tyr Gln Gln Lys Pro Gly Lys
 50          55          60
Gly Pro Lys Leu Leu Ile Tyr Ser Thr Ser Asn Leu Asn Ser Gly Val
 65          70          75          80
Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Ser Asp Tyr Thr Leu Thr
 85          90          95
Ile Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Leu Gln
100          105          110
Arg Asn Ala Tyr Pro Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile
115          120          125
Lys Ile Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly
130          135          140
Gly Ser Ser Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys
145          150          155          160
Pro Gly Ala Ser Val Lys Val Ser Cys Lys Ala Ser Gly Phe Asn Ile
165          170          175
Lys Asp Thr Tyr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu
180          185          190
Gln Trp Met Gly Arg Ile Asp Pro Ala Asn Gly Asn Thr Lys Ser Asp
195          200          205
Leu Ser Phe Gln Gly Arg Val Thr Ile Thr Ala Asp Thr Ser Ile Asn
210          215          220
Thr Ala Tyr Met Glu Leu Ser Ser Leu Arg Ser Asp Asp Thr Ala Val
225          230          235          240
Tyr Tyr Cys Ser Arg Glu Val Leu Thr Gly Thr Trp Ser Leu Asp Tyr
245          250          255
Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Gly Ser Gly Ser Ala
260          265          270
Asp Pro Ser Lys Asp Ser Lys Ala Gln Val Ser Ala Ala Glu Ala Gly
275          280          285
Ile Thr Gly Thr Trp Tyr Asn Gln Leu Gly Ser Thr Phe Ile Val Thr
290          295          300
Ala Gly Ala Asp Gly Ala Leu Thr Gly Thr Tyr Glu Ser Ala Val Gly
305          310          315          320
Asn Ala Glu Ser Arg Tyr Val Leu Thr Gly Arg Tyr Asp Ser Ala Pro
325          330          335
Ala Thr Asp Gly Ser Gly Thr Ala Leu Gly Trp Thr Val Ala Trp Lys
340          345          350

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Asn Asn Tyr Arg Asn Ala His Ser Ala Thr Thr Trp Ser Gly Gln Tyr
    355                      360                      365
Val Gly Gly Ala Glu Ala Arg Ile Asn Thr Gln Trp Leu Leu Thr Ser
    370                      375                      380
Gly Thr Thr Glu Ala Asn Ala Trp Lys Ser Thr Leu Val Gly His Asp
385                      390                      395                      400
Thr Phe Thr Lys Val Lys Pro Ser Ala Ala Ser Ile Asp Ala Ala Lys
    405                      410                      415
Lys Ala Gly Val Asn Asn Gly Asn Pro Leu Asp Ala Val Gln Gln
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<210> 5

<211> 1239

<212> DNA

<213> Streptomyces avidinii

<400> 5

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tcctcccca aaccctggat ttatgccaca tccaacctgg cttctggagt ccctgctcgc      180
ttcagtggca gtgggtctgg gacctcttac tctctcaca tccagcagag ggaggctgaa      240
gatgctgcca cttattactg ccagcagtggt attagtaacc caccacggtt cgggtgctggg      300
accaagctgg agctgaagat ctctggtctg gaaggcagcc cggaagcagg tctgtctcgg      360
gacgcaggtt ccggtctcag ccaggttcag ctggtccagt caggggctga gctggtgaag      420
cctggggcct cagtgaagat gtcctgcaag gcttctggct acacatttac cagttacaat      480
atgcactggg taaagcagac acctggacag ggcctggaat ggattggagc tatttatcca      540
ggaaatggtg atacttccta caatcagaag ttcaaaggca aggccacatt gactgcagac      600
aaatcctcca gcacagccta catgcagctc agcagcctga catctgagga ctctgcggtc      660
tattactgtg caagagcgca attacgacct aactactggt acttcgatgt ctggggcgca      720
gggaccacgg tcaccgtgag ctctggctct gggtcggcag acccctccaa ggactcgaag      780
gcccaggtct cggccgcca ggccggcatc accggcacct ggtacaacca gctcggctcg      840
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tggtgctgta cctccggcac caccgaggcc aacgcctgga agtccacgct ggtcggccac     1140
gacaccttca ccaaggtgaa gccgtccgcc gcctccatcg acgcggcgaa gaaggccggc     1200
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<210> 6

<211> 412

<212> PRT

<213> Streptomyces avidinii

<400> 6

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Glu Lys Val Thr Met Thr Cys Arg Ala Ser Ser Ser Val Ser Tyr Met
 20           25           30
His Trp Tyr Gln Gln Lys Pro Gly Ser Ser Pro Lys Pro Trp Ile Tyr
 35           40           45
Ala Thr Ser Asn Leu Ala Ser Gly Val Pro Ala Arg Phe Ser Gly Ser
 50           55           60
Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile Ser Arg Val Glu Ala Glu

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65					70					75					80
Asp	Ala	Ala	Thr	Tyr	Tyr	Cys	Gln	Gln	Trp	Ile	Ser	Asn	Pro	Pro	Thr
				85					90					95	
Phe	Gly	Ala	Gly	Thr	Lys	Leu	Glu	Leu	Lys	Ile	Ser	Gly	Leu	Glu	Gly
			100					105					110		
Ser	Pro	Glu	Ala	Gly	Leu	Ser	Pro	Asp	Ala	Gly	Ser	Gly	Ser	Ser	Gln
		115					120					125			
Val	Gln	Leu	Val	Gln	Ser	Gly	Ala	Glu	Leu	Val	Lys	Pro	Gly	Ala	Ser
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Val	Lys	Met	Ser	Cys	Lys	Ala	Ser	Gly	Tyr	Thr	Phe	Thr	Ser	Tyr	Asn
145					150					155					160
Met	His	Trp	Val	Lys	Gln	Thr	Pro	Gly	Gln	Gly	Leu	Glu	Trp	Ile	Gly
				165					170					175	
Ala	Ile	Tyr	Pro	Gly	Asn	Gly	Asp	Thr	Ser	Tyr	Asn	Gln	Lys	Phe	Lys
			180					185					190		
Gly	Lys	Ala	Thr	Leu	Thr	Ala	Asp	Lys	Ser	Ser	Ser	Thr	Ala	Tyr	Met
		195					200					205			
Gln	Leu	Ser	Ser	Leu	Thr	Ser	Glu	Asp	Ser	Ala	Val	Tyr	Tyr	Cys	Ala
	210					215					220				
Arg	Ala	Gln	Leu	Arg	Pro	Asn	Tyr	Trp	Tyr	Phe	Asp	Val	Trp	Gly	Ala
225					230					235					240
Gly	Thr	Thr	Val	Thr	Val	Ser	Ser	Gly	Ser	Gly	Ser	Ala	Asp	Pro	Ser
			245					250					255		
Lys	Asp	Ser	Lys	Ala	Gln	Val	Ser	Ala	Ala	Glu	Ala	Gly	Ile	Thr	Gly
		260					265						270		
Thr	Trp	Tyr	Asn	Gln	Leu	Gly	Ser	Thr	Phe	Ile	Val	Thr	Ala	Gly	Ala
	275						280					285			
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	290				295						300				
Ser	Arg	Tyr	Val	Leu	Thr	Gly	Arg	Tyr	Asp	Ser	Ala	Pro	Ala	Thr	Asp
305					310				315						320
Gly	Ser	Gly	Thr	Ala	Leu	Gly	Trp	Thr	Val	Ala	Trp	Lys	Asn	Asn	Tyr
			325						330				335		
Arg	Asn	Ala	His	Ser	Ala	Thr	Thr	Trp	Ser	Gly	Gln	Tyr	Val	Gly	Gly
		340					345						350		
Ala	Glu	Ala	Arg	Ile	Asn	Thr	Gln	Trp	Leu	Leu	Thr	Ser	Gly	Thr	Thr
		355					360					365			
Glu	Ala	Asn	Ala	Trp	Lys	Ser	Thr	Leu	Val	Gly	His	Asp	Thr	Phe	Thr
	370				375					380					
Lys	Val	Lys	Pro	Ser	Ala	Ala	Ser	Ile	Asp	Ala	Ala	Lys	Lys	Ala	Gly
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<210> 7

<211> 1280

<212> DNA

<213> Streptomyces avidinii

<400> 7

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agcagacacc	tggacagggc	ctggaatgga	ttggagctat	ttatccagga	aatggtgata	180
cttcctacaa	tcagaagttc	aaaggcaagg	ccacattgac	tgcagacaaa	tcctccagca	240

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cagcctacat gcagctcagc agcctgacat ctgaggactc tgcggtctat tactgtgcaa 300
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ccgtgagcaa gatctctggt ggcggtggct cgggcggtgg tgggtcgggt ggcggcggct 420
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caatcctgtc tgcattctcca ggggagaagg tcacaatgac ttgcagggcc agctcaagtg 540
taagttacat gcaactggtac cagcagaagc caggatcctc ccccaaacc tggatttatg 600
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<210> 8

<211> 423

<212> PRT

<213> Streptomyces avidinii

<400> 8

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20          25          30
Ser Tyr Asn Met His Trp Val Lys Gln Thr Pro Gly Gln Gly Leu Glu
35          40          45
Trp Ile Gly Ala Ile Tyr Pro Gly Asn Gly Asp Thr Ser Tyr Asn Gln
50          55          60
Lys Phe Lys Gly Lys Ala Thr Leu Thr Ala Asp Lys Ser Ser Ser Thr
65          70          75          80
Ala Tyr Met Gln Leu Ser Ser Leu Thr Ser Glu Asp Ser Ala Val Tyr
85          90          95
Tyr Cys Ala Arg Ala Gln Leu Arg Pro Asn Tyr Trp Tyr Phe Asp Val
100          105          110
Trp Gly Ala Gly Thr Thr Val Thr Val Ser Lys Ile Ser Gly Gly Gly
115          120          125
Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly
130          135          140
Ser Gly Gly Gly Gly Ser Ser Asp Ile Val Leu Ser Gln Ser Pro Ala
145          150          155          160
Ile Leu Ser Ala Ser Pro Gly Glu Lys Val Thr Met Thr Cys Arg Ala
165          170          175
Ser Ser Ser Val Ser Tyr Met His Trp Tyr Gln Gln Lys Pro Gly Ser
180          185          190
Ser Pro Lys Pro Trp Ile Tyr Ala Thr Ser Asn Leu Ala Ser Gly Val
195          200          205
Pro Ala Arg Phe Ser Gly Ser Gly Ser Gly Thr Ser Tyr Ser Leu Thr
210          215          220
Ile Ser Arg Val Glu Ala Glu Asp Ala Ala Thr Tyr Tyr Cys Gln Gln

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225          230          235          240
Trp Ile Ser Asn Pro Pro Thr Phe Gly Ala Gly Thr Lys Leu Glu Leu
          245          250          255
Lys Ser Ser Gly Ser Gly Ser Ala Asp Pro Ser Lys Asp Ser Lys Ala
          260          265          270
Gln Val Ser Ala Ala Glu Ala Gly Ile Thr Gly Thr Trp Tyr Asn Gln
          275          280          285
Leu Gly Ser Thr Phe Ile Val Thr Ala Gly Ala Asp Gly Ala Leu Thr
          290          295          300
Gly Thr Tyr Glu Ser Ala Val Gly Asn Ala Glu Ser Arg Tyr Val Leu
305          310          315          320
Thr Gly Arg Tyr Asp Ser Ala Pro Ala Thr Asp Gly Ser Gly Thr Ala
          325          330          335
Leu Gly Trp Thr Val Ala Trp Lys Asn Asn Tyr Arg Asn Ala His Ser
          340          345          350
Ala Thr Thr Trp Ser Gly Gln Tyr Val Gly Gly Ala Glu Ala Arg Ile
          355          360          365
Asn Thr Gln Trp Leu Leu Thr Ser Gly Thr Thr Glu Ala Asn Ala Trp
          370          375          380
Lys Ser Thr Leu Val Gly His Asp Thr Phe Thr Lys Val Lys Pro Ser
385          390          395          400
Ala Ala Ser Ile Asp Ala Ala Lys Lys Ala Gly Val Asn Asn Gly Asn
          405          410          415
Pro Leu Asp Ala Val Gln Gln
          420

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<210> 9
<211> 18
<212> PRT
<213> Artificial Sequence

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<220>
<223> pKOD linker

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<400> 9
Gly Leu Glu Gly Ser Pro Glu Ala Gly Leu Ser Pro Asp Ala Gly Ser
 1          5          10          15
Gly Ser

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<210> 10
<211> 15
<212> PRT
<213> Artificial Sequence

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<220>
<223> Linker used to create a scFvSA version of
      anti-CD20mAb, B9E9 in the VLVH orientation

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<400> 10
Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
 1          5          10          15

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<210> 11

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<211> 25
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Linker used to create a version of B9E9 scFvSA in
 the VHVL orientation

<400> 11
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 1 5 10 15
 Gly Gly Gly Ser Gly Gly Gly Gly Ser
 20 25

<210> 12
 <211> 32
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Oligonucleotide primer

<400> 12
 tgccgtgaat tcgtsmarct gcagsartcw gg 32

<210> 13
 <211> 31
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Oligonucleotide primer

<400> 13
 tgccgtgaat tccattswgc tgaccartct c 31

<210> 14
 <211> 35
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Oligonucleotide primer

<400> 14
 tagctggcgg ccgccctgtt gaagctcttg acaat 35

<210> 15
 <211> 34
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Oligonucleotide primer

<400> 15
 tagctggcgg ccgctttctt gtccaccttg gtgc 34

<210> 16
 <211> 47
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Oligonucleotide primer

<400> 16
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<210> 17
 <211> 32
 <212> DNA
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<220>
 <223> Oligonucleotide primer

<400> 17
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<210> 18
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 <213> Artificial Sequence

<220>
 <223> Oligonucleotide primer

<400> 18
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<210> 19
 <211> 38
 <212> DNA
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<220>
 <223> Oligonucleotide primer

<400> 19
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<210> 20
 <211> 58
 <212> DNA
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<220>

<223> Oligonucleotide primer

<400> 20
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<210> 21

<211> 58

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligonucleotide primer

<400> 21
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<210> 22

<211> 50

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligonucleotide primer

<400> 22
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<210> 23

<211> 37

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligonucleotide primer

<400> 23
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<210> 24

<211> 32

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligonucleotide primer

<400> 24
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<210> 25

<211> 35

<212> DNA

<213> Artificial Sequence

<220>
 <223> Oligonucleotide primer

 <400> 25
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 <210> 26
 <211> 35
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide primer

 <400> 26
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 <210> 27
 <211> 79
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide primer

 <400> 27
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 tgggtcgggc ggcggcggc 79

 <210> 28
 <211> 79
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide primer

 <400> 28
 tcgagccgcc gccgcccgc ccaccaccac ccgagccgcc gccacccgc ccaccaccgc 60
 ccgagccacc gccaccaga 79

 <210> 29
 <211> 18
 <212> PRT
 <213> Artificial Sequence

 <220>
 <223> Linker sequence

 <400> 29
 Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly
 1 5 10 15
 Gly Ser

<210> 30
 <211> 35
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Linker sequence

<400> 30
 Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly
 1 5 10 15
 Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly
 20 25 30
 Gly Gly Ser
 35

<210> 31
 <211> 18
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Linker sequence pKOD2

<400> 31
 Gly Leu Glu Gly Ser Pro Glu Ala Gly Leu Ser Pro Asp Ala Gly Ser
 1 5 10 15
 Asp Ser

<210> 32
 <211> 21
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Oligonucleotide primer

<400> 32
 acgacggttg ctgcggcggg c 21

<210> 33
 <211> 21
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Oligonucleotide primer

<400> 33
 aggctcatta atgatgcggg t 21

<210> 34

<211> 33
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Oligonucleotide primer

<400> 34
 ggatccaagc ttacgatcac ggatcatgaac acg 33

<210> 35
 <211> 33
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Oligonucleotide primer

<400> 35
 ctcgagaagc tttaactaaa ttaatacagc gga 33

<210> 36
 <211> 783
 <212> DNA
 <213> Streptomyces avidinii

<400> 36
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 tcctgcacag cttctggcctt caacattaaa gacacctata tgcactgggt gaagcagagg 120
 cctgaacagg gcctggaatg gattggaagg attgatcctg cgaatggtaa tagtaaatat 180
 gtcccgaagt tccagggcaa ggccactata acagcagaca catcctccaa cacagcctac 240
 ctgcagctca ccagcctgac atctgaggac actgccgtct attattgtgc tccgtttggt 300
 tactacgtgt ctgactatgc tatggcctac tggggtcaag gaacctcagt caccgtctcc 360
 tcaaagatct ctgggtggcg tggctcgggc ggtggtgggt cgggtggcgg cggctcgggt 420
 ggtggtgggt cgggcgggcg cggctcagac gacattgtgc tgacccaatc tccagcttct 480
 ttggctgtgt ctcttgggca gagggccact atgtcctgca gagccggtga aagtgttgat 540
 atttttggcg ttgggttttt gacttggtac cagcagaaac caggacagcc acccaactc 600
 ctcatctatc gtgcatccaa cctagaatct gggatccctg tcaggttcag tggcactggg 660
 tctaggacag acttcaccct catcattgat cctgtggagg ctgatgatgt tgccacctat 720
 tactgtcagc aaactaatga ggatccgtac acgttcggag gggggaccaa gctggaata 780
 aag 783

<210> 37
 <211> 786
 <212> DNA
 <213> Streptomyces avidinii

<400> 37
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 ccggaacagg gcctggaatg gattggttggt attgatccgg aaaatgggtga taccgaatat 180
 gccccgaaat tccagggcaa agccacgatg accaccgata cctcctccaa caccgcctac 240
 ctgcagctca gcagcctgac ctctgaagat accgccgtct attactgtaa taccctgtgt 300
 ctatctacca tgattacgac gcgttggttc ttcgatgtct ggggcgcagg gaccacggtc 360

accgtctcca	agatctctgg	tggcgggtggc	tcgggcggtg	gtgggtcggg	tggcggcggc	420
tcggttggtg	gtgggtcggg	cggcggcggc	tcgagcgata	ttgtgctgac	ccagtctccg	480
gcttccttaa	ccgtatctct	gggtctgcgt	gccaccatct	catgccgtgc	cagcaaaagt	540
gtcagtgcac	ctggctatag	ttatatgcat	tggtaccaac	agcgtccggg	tcagccgccg	600
aaactcctca	tctatcttgc	atccaacctc	caatctgggt	tcccggcccc	tttcagtggc	660
agtgggtctg	ggaccgattt	caccctcaac	atccatccgg	tggaagaaga	agatgctgca	720
acctattact	gtcagcatag	tcgtgaactt	ccgacgttcg	gtggtggcac	caaactggaa	780
atcaag						786

<210> 38

<211> 771

<212> DNA

<213> Streptomyces avidinii

<400> 38

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ccgggcaagg	gtttaaagtg	gatgggctgg	attaacacca	aaactgggtg	agcaacctat	180
gttgaagagt	ttaagggctg	ctttgccttc	tctttggaga	cctctgccac	cactgcctat	240
ttgcagatca	acaacctcaa	aaatgaggac	acggctaaat	atttctgtgc	acgttgggac	300
ttctatgatt	acgtggaagc	tatggattac	tggggccaag	ggaccacggt	caccgtctcc	360
aagatctctg	gtggcgggtg	ctcgggcggg	ggtgggtcgg	gtggcggcgg	ctcgggtggg	420
ggtgggtcgg	gcggcggcgg	ctcgagcgat	attgtgatga	cccagtctca	acgtttcatg	480
tcacttcag	taggtgatcg	tgtcagcgtc	acctgcaaa	ccagtcaaaa	tgtgggtacg	540
aatgttgctt	ggtatcaaca	gaaaccgggt	caatccccga	aagcactgat	ttactcggca	600
tcctaccgtt	acagtgggtg	cccggatcgc	ttcaccggca	gtggttctgg	gaccgatttc	660
acgtcaccca	tcagcaatgt	acagtctgaa	gacttggcgg	agtatttctg	tcacaaatat	720
tacacctatc	cgttattcac	gttcggctcg	gggaccaagt	tggaaatgaa	g	771

<210> 39

<211> 762

<212> DNA

<213> Streptomyces avidinii

<400> 39

caggtgaaac	tgcagcagtc	tggtgcagaa	cttgtgcgtt	cagggacctc	agtcaaattg	60
tcctgcaccg	cttctggctt	caacattaaa	gattcctata	tgcattgggt	gcgtcagggt	120
ccggaacagg	gcctggaatg	gattggttgg	attgatccgg	agaatggtga	tactgaatat	180
gcaccgaagt	tccagggcaa	agccaccttt	actaccgata	cctcctccaa	caccgcctac	240
ctgcagctca	gcagcctgac	ctctgaagat	actgccgtct	attattgtaa	tgaagggact	300
ccgactggtc	cgtactactt	tgattactgg	ggtcaagggg	ccacggtcac	cgtctccaag	360
atctctggtg	gcgggtggctc	gggcgggtgg	gggtcgggtg	gcggcggctc	gggtggtggg	420
gggtcggggc	gcggcggctc	gagcgaaaat	gtgctcacc	agtctccggc	aatcatgtct	480
gcactctccg	gtgagaaaat	caccattacc	tgacgtgcca	gctcaagtgt	aagttacatg	540
cattggttcc	agcagaaaac	gggtacttct	ccgaaactct	ggatttatag	cacctccaac	600
ctggcttctg	gtgttcgggc	tcgcttcagt	ggcagtgggt	ctgggacctc	ttactctctc	660
accatcagcc	gtatggaagc	tgaagatgct	gccacttatt	actgccagca	acgtagtagt	720
tatccgctca	cgttcgggtc	tggcaccaaa	ctggaactga	ag		762

<210> 40

<211> 765

<212> DNA

<213> Streptomyces avidinii

<400> 40

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tctgtgagc	cctctggatt	ccctttcaat	cgctatgcc	tgtcttgggt	tcgccagact	120
ccagagaaga	ggctggagtg	ggtcgcattc	attagtagtg	atggatcgc	ctactatgca	180
gacagtgtga	agggccgatt	caccatctcc	agagataatg	ccaggaacat	cctgtacct	240
caaatgagca	gtctgaggtc	tgaggacacg	gccatgtatt	actgtgcaag	agtttattac	300
tacggtagta	gttactttga	ctactggggc	caagggacca	cggtcaccgt	gagcaagatc	360
tctgggtggc	gtggctcggg	cgggtgggtg	tcgggtggcg	gcggctcggg	tggtgggtgg	420
tcgggcccgc	gcggctcgag	cgacatccag	atgactcagt	ctccaaaatt	catgcccaca	480
tcagtaggag	acagggtcag	cgtcacctgc	aaggccagtc	agaatgcggg	tactaatgta	540
gcctggtatc	aacagaaacc	agggcaatct	cctaaagcac	tgatttactc	ggcatcgtct	600
cggaaacagt	gagtccttga	tcgcttcaca	ggcagtggtg	ctgggacaga	tttactctc	660
accatcagca	atgtgcagtc	tgaagacttg	gcagagtatt	tctgtcagca	atataacagc	720
tactctctgg	tcacgttcgg	tgctgggacc	aagctggaaa	ttaaag		765

<210> 41

<211> 768

<212> DNA

<213> Streptomyces avidinii

<400> 41

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tcttgcaaag	cttctggcta	caccttcacc	gatcatgcaa	ttcattgggt	gaaacagaac	120
cgggaacagg	gcctggaatg	gattgggttat	ttctctccgg	gtaatgatga	tttcaaatac	180
aatgaacggt	tcaaaggcaa	agccacgctg	accgcagata	aatcctccag	caccgcctac	240
gtgcagctca	acagcctgac	gtctgaagat	tctgcagtg	atttctgtac	gcgttccctg	300
aatatggcct	actgggggtca	aggtacctca	gtcacctctc	ccaagatctc	tggtggcggt	360
ggctcggggc	gtgggtgggtc	gggtggcggc	ggctcgggtg	gtgggtgggtc	gggcggcggc	420
ggctcgagcg	atattgtgat	gtcacagtc	ccgtctctcc	taccgggtgc	agttggcgaa	480
aaagttacct	tgagctgcaa	atccagtcag	agccttttat	atagtggtaa	tcagaaaaac	540
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tccgtcgtg	aatctgggg	cccggatcgc	ttcaccggca	gtgggtcttg	gaccgatttc	660
accctctcca	tcagcagtg	gaaaaccgaa	gacctggcag	tttattactg	tcagcagtat	720
tatagctatc	cgctcacgtt	cgggtgctgg	accaaactgg	tgctgaag		768

<210> 42

<211> 765

<212> DNA

<213> Streptomyces avidinii

<400> 42

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tcttgtgctg	cttctggctt	cacctttagt	gatgcctgga	tggttgggt	ccgccagtc	120
cggagaaaag	ggcttgaatg	ggttgctgaa	attcgtaaca	aagccaataa	tcatggtacc	180
tattatgatg	agtctgtgaa	agggcgcttc	accatctcac	gtgatgattc	caaaagtcgt	240
gtgtacctgc	aaatgattag	cttacgtgct	gaagataccg	ggctttatta	ctgtaccggg	300
gaatttgcta	actggggcca	ggggacgctg	gtcaccgtct	ctaagatctc	tggtggcggt	360
ggctcggggc	gtgggtgggtc	gggtggcggc	ggctcgggtg	gtgggtgggtc	gggcggcggc	420
ggctcgagcg	atgttgatg	gacccaaact	ccgctctccc	tgccggtcac	tcttgggtgat	480
caagcttcca	tctcttgccg	ttctagtcag	aacctgttac	ataacaatgg	taacacctat	540
ttatattggt	tctgcagaa	atcaggccag	tctccgaaac	tgctgattta	tcgcgcaccc	600
atccgctttt	ctgggtgtccc	ggatcgcttc	agtggcagtg	gttcagaaac	cgatttcacg	660
ctcaagatca	gccgtgtgga	agctgaagac	ctgggtgttt	atttctgctt	tcaaggtagc	720
catgttccgt	ggacgttcgg	tggtggcacc	aaactggaaa	tcaag		765

<210> 43
 <211> 741
 <212> DNA
 <213> *Streptomyces avidinii*

<400> 43
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 ccaggaaata aaatggagtg gatgggatac ataagctaca gtggtagcac tggctacaac 180
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 cagttgaact ctgtaactac tgaggacaca gccacatatt actgtgcaag atacagtagc 300
 cttgattact ggggccgagg agtcatggtc gcagtcctca agatctctgg tggcgggtggc 360
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 tcgagcgatg ttgtgatgac ccagacacca ccgtctttgt cgggttgccat tggacaatca 480
 gtctccatct cttgcaagtc aagtcagagc ctctgtatata gtgatggaaa gacatatttg 540
 cattggttat tacagagtcc tggcagggtct ccgaagcgcc taatctatca ggtgtctaata 600
 ctgggctctg gagtccctga caggttcagt ggcaactgat cacagaaaga ttttacactt 660
 aaaatcagca gagtggaggc tgaggatttg ggagtttact actgcgcgca aactacacat 720
 tttctctctca cgttcgggttc g 741

<210> 44
 <211> 765
 <212> DNA
 <213> *Streptomyces avidinii*

<400> 44
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 cctggacagg gcctggaatg gattggagct atttatccag gaaatgggtga tacttccctac 180
 aatcagaagt tcaaaggcaa ggccacattg actgcagaca aatcctccag cacagcctac 240
 atgcagctca gcagcctgac atctgaggac tctgcggtct attactgtgc aagagcgcaa 300
 ttacgacctc actactggta cttcgatgtc tggggcgcag ggaccacggg caccgtgagc 360
 aagatctctg gtggcgggtg ctcgggcggg ggtgggtcgg gtggcggcgg ctcgggtggg 420
 ggtgggtcgg gcggcggcgg ctcgagcgac atcgtgctgt cgcagtcctc ageaatcctg 480
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 atgcactggg accagcagaa gccaggatcc tccccaaac cctggattta tgccacatcc 600
 aacctggctt ctggagctcc tgctcgcttc agtggcagtg ggtctgggac ctcttactct 660
 ctcacaatca gcagagtggg ggctgaagat gctgccactt attactgcca gcagtggatt 720
 agtaaccac ccacgttcgg tgctgggacc aagctggagc tgaag 765

<210> 45
 <211> 765
 <212> DNA
 <213> *Streptomyces avidinii*

<400> 45
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 aatcagaagt tcaaaggcaa ggccacattg actgcagaca aatcctccag cacagcctac 240
 atgcagctca gcagcctgac atctgaggac tctgcggtct attactgtgc aagaagcacc 300
 tattacggcg gtgattggta cttcaacgtc tggggcgcag ggaccacggg caccgtgagc 360
 aagatctctg gtggcgggtg ctcgggcggg ggtgggtcgg gtggcggcgg ctcgggtggg 420


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ggtagggtcgg gcggcgggcgg ctcgagccag atcgtgctgt cgcagtctcc agcaatcctg      480
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attcactggg ttccagcagaa gccaggatcc tccccaaac cctggattta tgccacatcc      600
aacctggctt ctggagtcctc tgtgcgcttc agtggcagtg ggtctgggac ctcttactct      660
ctcacaatca gcagagtggg ggctgaagat gctgccactt attactgcca gcagtggacc      720
agtaaccac ccacgttcgg tggcgggacc aagctggaga tcaag                          765

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<210> 46
 <211> 780
 <212> DNA
 <213> Streptomyces avidinii

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<400> 46
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ccagggaaaag ggctagaatg gattggagag attaatacaa ctagcagtac gataaacttt      180
acgccatctc taaaggataa agtcttcac cccagagaca acgcaaaaaa tacgctgtac      240
ctgcaaatga gcaaagttag atccgaggac acagcccttt attactgtgc aagaggggaa      300
tactataggt acggagatgc tatggactac tgggggtcaag gaacctcagt caccgtgagc      360
aagatctctg gtggcggtgg ctcgggctgg ggtgggtcgg gtggcggcgg ctggggtgg      420
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gctgtatctc tgggacagag ggccaccatc tcatgcaggg ccagcaaaaag tgtcagtaca      540
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atctatcttg catccaacct agaactctgg gtccctgcca ggttcagtgg cagtgggtct      660
gggacagact tcacctcaa catccatcct gtggaggagg aggatgctgc aacctattac      720
tgtagcaca gtagggagct tccattcacg ttcggctcgg ggacaaaagt ggaaataaag      780

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<210> 47
 <211> 5
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Gly Ser linker

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<400> 47
Gly Gly Gly Gly Ser
1          5

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<210> 48
 <211> 5
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Five amino acid linker

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<400> 48
Gly Ser Gly Ser Ala
1          5

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